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10/815,241	03/30/2004	Gabriel Loh	P18222	8141

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ALROBAYE, IDRISS N	
ART UNIT	**PAPER NUMBER**
2183	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,241	LOH, GABRIEL	
	Examiner	Art Unit	
	Idriss N. Alrobaye	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to communications through the applicant's application filed on 06/19/2007.

2. Claims 1-21 remains for examination.

3. Applicant's amendments to the specification have been considered and the objections have been withdrawn.

4. Applicant's amendments to overcome the claim objections have been considered and the objections have been withdrawn.

5. Applicant's amendments to overcome 35 USC 101 rejections have been considered and the rejections have been withdrawn.

6. Applicant's amendments to claim 7 have been considered and the rejections under 35 USC 112 2nd paragraph have been withdrawn.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Baweja et al. U.S. Patent No. 6,332,189 (hereinafter Baweja).

9. As per claim 1, Baweja teaches an apparatus comprising:

storage means for storing a first type of branch history information (see e.g. Fig. 1b-1c, wherein element 122 (Fig. 1b) and element 132 (Fig. 1c) are the storage means. Also, see e.g. Fig. 2, wherein element 220 is Fig. 1b and element 230 is Fig. 1c, see col. 4, lines 51-67 to col. 5, lines 1-51);

intermediate prediction means (see e.g. Fig. 2, elements 210, 220 and 230) for generating a plurality of intermediate branch prediction results based off of a plurality of portions of the store branch history information (elements 210, 220 and 230 generates a plurality of intermediate branch prediction based off the store branch history information. See e.g. col. 4, lines 12-18 and col. 5, lines 1-51), wherein the intermediate prediction means uses a portion of the branch history information that is smaller than all of the branch history information stored within the storage means in order to generate the plurality of intermediate branch prediction results (see e.g. Fig. 2, wherein as long as all the branch history information are not been used for the final result, then it's smaller all of the branch history information stored within the storage means; see also, col. 4, lines 51-67 to col. 5, lines 1-51);

final prediction means for generating a final branch prediction result based off of the plurality of intermediate branch prediction results (see e.g. Fig. 2, wherein the output of the multiplexer element 250 generates the final branch prediction; see also col. 5, lines 21-43).

10. As per claim 2, Baweja teaches the invention as claimed above. Baweja further teaches the apparatus of claim 1 wherein the storage means is a register within a microprocessor (see e.g. Fig. 1c, element 132).

11. As per claim 3, Baweja teaches the invention as claimed above. Baweja further teaches the apparatus of claim 1 wherein the storage means is a memory location within a computer system (see e.g. Fig. 1b, element 122).

12. As per claim 4, Baweja teaches the invention as claimed above. Baweja further teaches the apparatus of claim 1 wherein the intermediate prediction means comprises a plurality of intermediate branch predictors to perform a plurality of intermediate branch predictions in parallel (see e.g. Fig. 2, wherein elements 220 and 230 are in parallel).

13. As per claim 5, Baweja teaches the invention as claimed above. Baweja further teaches the apparatus of claim 1 wherein the final prediction means is a single branch predictor (see e.g. Fig. 2, elements 240 and 250 outputs a final prediction).

14. As per claim 6, Baweja teaches the invention as claimed above. Baweja further teaches the apparatus of claim 1 wherein the intermediate branch prediction means comprises a first plurality of intermediate branch prediction units to perform a plurality of branch predictions in parallel, and a second plurality of intermediate branch prediction

units to perform a plurality of branch predictions in series with the first plurality of intermediate branch prediction units (see e.g. Fig. 2, and col. 4, lines 60-67).

15. As per claim 7, Baweja teaches a computer system comprising:

a memory unit to store a first and second plurality of instructions (see e.g. abstract; col. 1, lines 15-19, lines 60-67; col. 6, lines 40-46);

a processor to predict whether to execute the first or the second instructions (see e.g. abstract and Fig. 2; see also col. 1, lines 15-19) based, at least in part, on an intermediate branch prediction to be made by a plurality of intermediate branch prediction units (see e.g. Fig. 2, wherein elements 220, 230 and 210 are the intermediate branch prediction units), the intermediate branch predictions units each corresponding to a different portion of a set of branch history information, each different portion being smaller than the set of branch history information (each branch prediction unit have branch history information, see the rejection for claim 1; same reasoning for rejection applied for this claim).

16. As per claim 8, Baweja teaches the invention as claimed above. Baweja further teaches the computer system of claim 7 wherein the processor comprises a final branch prediction unit to perform a final branch prediction based on predictions of the intermediate branch prediction units (see e.g. Fig. 2, wherein the output of the multiplexer element 250 generates the final branch prediction; see also col. 5, lines 21-43).

17. As per claim 9, Baweja teaches the invention as claimed above. Baweja further teaches the computer system of claim 8 further comprising a branch history storage unit to store the set of branch history information (see e.g. Fig. 1b-1c, wherein element 122 (Fig. 1b) and element 132 (Fig. 1c) are the storage means. Also, see e.g. Fig. 2, wherein element 220 is (Fig. 1b) and element 230 (Fig. 1c)).

18. As per claim 10, Baweja teaches the invention as claimed above. Baweja further teaches the computer system of claim 9 wherein the branch history storage unit is a memory location (see e.g. Fig. 1b, element 122).

19. As per claim 11, Baweja teaches the invention as claimed above. Baweja further teaches the computer system of claim 9 wherein the branch history storage unit is a register within the processor (see e.g. Fig. 1c, element 132).

20. Claims 12-17 are rejected on grounds corresponding to the reasons given above for claims 1-6.

21. As per claim 18, Baweja teaches a method comprising:

accessing a plurality of branch prediction segments in parallel (see e.g. Fig. 1b-1c, wherein element 122 (Fig. 1b) and element 132 (Fig. 1c) are the segments; Also,

see e.g. Fig. 2, wherein element 220 is (Fig. 1b) and element 230 is (Fig. 1c); see e.g. col. 4, lines 51-67 to col. 5, lines 1-51, parallel);

performing a plurality of intermediate branch predictions based off of the plurality of branch prediction segments (see e.g. Fig. 2, elements 220 and 230), wherein each intermediate branch prediction is based off of a different branch prediction segment (see e.g. Fig. 1b-1c and Fig. 2, elements 220 and 230, wherein each branch prediction is based off of a different segment) and each branch prediction segment is smaller than the sum of the branch prediction segments (see e.g. Fig. 2, wherein as long as all the branch prediction segments are not been used, then it's smaller than the sum of the branch prediction segments; see also, col. 4, lines 51-67 to col. 5, lines 1-51); and

generating a signal to indicate a final branch prediction (see Fig. 2, wherein the output coming out of the multiplexer element 250 is considered equivalent to the signal indicating the final branch prediction).

22. As per claim 19, Baweja teaches the invention as claimed above. Baweja further teaches the method of claim 18 further comprising performing a final branch prediction based off of the plurality of intermediate branch predictions (see e.g. Fig. 2, wherein the output of the multiplexer element 250 generates the final branch prediction; see also col. 5, lines 21-43).

23. Claims 20-21 are rejected on grounds corresponding to the reasons given above for claims 18-19.

Response to Arguments

24. Applicant's arguments filed 06/19/2007 have been fully considered but they are not persuasive.

Note: The Examiner has pointed out particular references contained in the prior art of record within the body of this action for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply. Applicant, in preparing the response, should consider fully the entire reference as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

25. As per applicant argument:

As per claim 1, Baweja teaches an apparatus comprising:
storage means for storing a first type of branch history information (see e.g. Fig. 1b-1c, wherein element 122 (Fig. 1b) and element 132 (Fig. 1c) are the storage means. Also, see e.g. Fig. 2, wherein element 220 is (Fig. 1b) and element 230 (Fig. 1c), see col. 4, lines 51-67 to col. 5, lines 1-51);
Specifically, the undersigned is unable to find element 220 in Fig. 1b or element 230 in Fig. 1c of Baweja. Even if these elements (220 and 230) were relied on to reject the claimed element of storage means" the undersigned is at a loss. Elements 220 and 230 appear to be predictors shown in Fig. 2 and appear to have nothing to do with the claimed "storage means"

Examiner response: first of all, the examiner mentioned "wherein element 122 (Fig. 1b) and element 132 (Fig. 1c) are considered equivalent to storage means. See

col. 4, lines 3-5, wherein the recent history is stored in 122, and element 132 stores global history.

Second, elements 220 and 230 are predictors but they have storage means for storing branch history information.

As for the confusion "specifically, the undersigned is unable to find element 220 in Fig. 1b or element 230 in Fig. 1c", the examiner pointed out that wherein element 220 is Fig. 1b and element 230 is Fig. 1c, and the details are shown in col. 4, lines 51-67 to col. 5, lines 1-51. For instance, col. 5, lines 5-10 shows wherein global predictor 230 performs a global prediction and the structure is the same as Fig. 1c. Further, col. 5, lines 2-4 stated that local predictor 220 is the same as Fig. 1b which performs local prediction.

26. As per applicant argument:

In particular, the office fails to establish at least the highlighted elements of claim 12 are taught by Baweja (reproduced below for the east of office);

12. A processor comprising:

a storage unit for storing a first type of branch history information; intermediate branch prediction results based off of ***a plurality of portions of the store branch history information*** *wherein* ***each intermediate prediction unit uses a portion of the branch history information that is smaller than all of the branch history information stored within the storage unit*** *in order to generate the plurality of intermediate branch prediction results.*

"the office fails to establish that Baweja teaches that a plurality of portions of the stored branch history information are used to generate the intermediate branch predictions"

Fig. 2 of Baweja fails to teach the highlighted portion of claim 12 above. Also, column 4, lines 51-67 to column 5, lines 1-51, fail to cure this shortcoming.

Examiner response: As for the "***a plurality of portions of the store branch history information***", elements 210, 220 and 230 generates portions of the store branch history information. For instance, element 220 generates one portion, element 230 generates another portion, thus the two portions coming out of elements 220 and element 230 are considered equivalent to a plurality of portions.

As for the "***each intermediate prediction unit uses a portion of the branch history information that is smaller than all of the branch history information stored within the storage unit***", since elements 220 and 230 contain the storage, thus, each intermediate prediction unit (for instance element 220) uses a portion of the branch history information (uses the history information contained within element 220) that is smaller than all of the branch history information stored within the storage unit (it's in fact smaller than all (content of both elements 220 and 230) of the branch history information stored with the storage means (both elements 220 and 230)).

27. As per applicant argument:

More particularly, the following assumption by the Office is not taught by the cited portions of Baweja:

"wherein as long as all the branch history information are not been used for the final result, then it's smaller than all of the branch history information stored within the storage means ... "

There is simply no such teaching by the cited portions of Baweja. The Office appears to be making "suggestions" that are simply unsupported by a rejection under 35 USC § 102.

Examiner response:

The examiner disagrees, the above statement is truly presented in the cited portions of Baweja. For instance, see Fig. 2, wherein elements 220 and 230 have the storage means (see "response to arguments" above for the storage means also the rejections above). Since elements 220 and 230 have the storage means, the multiplexer element 250 always selects one and only input which is either element 220 and 230. Therefore, the result is going to come from either element 220 or 230 but not both since it's element 250 is a selector and it only selects one at a time. Since the multiplexer 250 never select both elements 220 and 230 at once, this would be equivalent to saying "*all the branch history information are not been used for the final result*". Further, *the generated result* (the result that is generated by the multiplexer element 250) *is smaller than all of the branch history information stored within the storage means* (stored in both elements 220 and 230).

Suggestions: To possibly overcome the reference, it is suggested that the applicant focuses on the detailed implementation shown in Figs. 4 and 5 of the applicant's drawing.

Conclusion

28. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

29. The following is text cited from 37 CFR 1.111(c): In amending reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Totsuka et al. U.S. Patent No. 6,640,298 shows local, global and choice branch predictions with global history register in common.
- Muthusamy U.S. Patent No. 6,108,774 shows branch predications storage that predicts multiple branches and contains a final prediction

- Zuraski, Jr. et al. U.S. Patent No. 6,502,188 shows dynamic classification of conditional branches in global history branch prediction
- Dutta et al. "Control flow prediction with Tree-Like subgraphs for superscalar processors" shows tree like predictors.
- See also PTO-892

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Idriss N. Alrobaye whose telephone number is 571-270-1023. The examiner can normally be reached on Mon-Fri from 8:00 to 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on 571-272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RICHARD L. ELLIS
PRIMARY EXAMINER

Idriss Alrobaye